Carbohydrate uptake from xylem vessels and its distribution among stem tissues and buds in walnut (Juglans regia L)

Titre	Carbohydrate uptake from xylem vessels and its distribution among stem tissues and buds in walnut (Juglans regia L)
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Auteur	Bonhomme, Marc [1], Peuch, Médéric [2], Ameglio, Thierry [3], Rageau, Rémy [4], Guilliot, Agnès [5], Decourteix, Mélanie [6], Alves, Georges [7], Sakr, Soulaiman [8], Lacointe, André [9]
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Résumé en anglais	Bud break pattern is a key determinant of tree architecture. The mechanisms leading to the precedence of certain buds over the others are not yet fully explained, but the availability of soluble sugars may play a significant role, especially those in the xylem sap at the onset of the growing period. Here, we measured carbon availability in the different tissues (bud, xylem and bark). To assess the capacity of buds to use the xylem sap carbohydrates, the fluxes between xylem vessels and parenchyma cells, bark and buds of walnut (Juglans regia cv 'Franquette') were measured during the rest period until bud break. This uptake capacity varies according to the temperature, the sugar and the position on the branch of the fragment studied. Between December and March, in xylem tissues, the active component of sucrose uptake was predominant compared with diffusion (90% of the total uptake), whereas the active component accounted for more moderate amounts in buds (50% of the uptake). The active uptake of hexoses took place belatedly (April) in xylem. The flow rates between xylem vessels and buds increased 1 month before bud break and reached 2000 µg sucrose h−1 g DW−1. Fluxes seemed to depend on bud position on the branch. However, this study strongly suggests that they were mainly dependent on the sink strength of the buds and on the sink competition between bud, xylem parenchyma and bark.
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